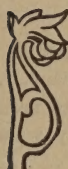


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Catalogue of the
State School of Mines
and Metallurgy

El Paso, Texas



1917-1918

BOARD OF REGENTS

OFFICERS

FREDERICK W. COOK, *Chairman*
GEORGE W. BRACKENRIDGE, *Vice Chairman*
E. J. MATHEWS, *Secretary*, Austin

REGENTS

Terms expire January, 1919

FREDERICK W. COOK.....San Antonio
*A. W. FLY, M. D.....Galveston
GEORGE W. LITTLEFIELD.....Austin
JOHN SEALY.Galveston

Terms expire January, 1921

W. R. BRENTS.....Sherman
W. H. DOUGHERTY.....Gainesville
†S. J. JONES.....Salado
J. A. KEMP.....Wichita Falls
‡G. S. McREYNOLDS, M. D.....Temple

Terms expire January, 1923

§WILBUR P. ALLEN.....Austin
GEORGE W. BRACKENRIDGE.....San Antonio
||J. W. BUTLER.....Clifton
C. E. KELLY.....El Paso
RALPH STEINER, M. D.....Austin

STANDING COMMITTEES

AUDITING: Messrs. Brents, Kelly.
BUILDINGS AND GROUNDS: Messrs. Steiner, Littlefield, Sealy.
COMPLAINTS AND GRIEVANCES: Messrs. Dougherty, Kemp, Sealy.
EXECUTIVE: Messrs. Cook, Brackenridge, Littlefield.
FINANCE: Messrs. Brackenridge, Brents, Kemp.
LAND: Messrs. Littlefield, Brents, Dougherty.
LEGISLATION: Messrs. Kemp, Dougherty, Steiner.
MEDICAL DEPARTMENT: Messrs. Sealy, Brackenridge, Cook.
STATE SCHOOL OF MINES AND METALLURGY: Messrs. Kelly, Brents, Kemp.

The Board of Regents meets in Austin on the fourth Tuesday of April and October and on the day preceding Commencement Day, and in Galveston in May on the day on which the graduating exercises of the Department of Medicine are held.

*Resigned.

†Resigned October 11, 1917.

‡Resigned May 31, 1917.

§Resigned October 11, 1917.

||Resigned May 30, 1917.

STATE SCHOOL OF MINES AND METALLURGY

EL PASO, TEXAS

ADMINISTRATIVE OFFICERS

ROBERT ERNEST VINSON, D. D., LL. D., *President*, Austin.

STEVE HOWARD WORRELL, B. S., *Dean*.

WILLIAM ROBERT LONG, *Auditor*, Austin.

RUTH MUNRO AUGUR, *Registrar*.

FACULTY

STEVE HOWARD WORRELL, *Professor of Mining and Metallurgy; Dean*.
B. S., Texas, 1901.

JOHN WILLIAM KIDD, *Professor of Engineering*.

B. S., Oklahoma A. and M., 1904; E. E., Texas A. and M., 1909.

HUGH DAVIDSON PALLISTER, *Professor of Geology and Mining*.

B. S., Case School of Applied Science, 1906; E. M., 1914.

FRANKLIN HUPP SEAMON, *Professor of Chemistry and Assaying*.

E. M., Rolla School of Mines, 1891.

JOHN FIELDING, JR., *Adjunct Professor of English and Economics;*
Lecturer on Mining Law.

B. A., Washington and Jefferson, 1905.

*THOMAS JOSEPH DWYER, *Instructor in Engineering*.

B. S. in C. E., Texas A. and M., 1912.

†ARTHUR WILLIAM FAHRENWALD, *Instructor in Engineering*.

B. S., South Dakota State School of Mines, 1914; Met. E., 1915; E. M.,
New Mexico State School of Mines, 1916.

JULES LOUIS HENRY, *Instructor in Modern Languages*.

Bachelier es Lettres, State University of France, 1899.

BURT FRANKLIN JENNESS, *Lecturer on First Aid and Hygiene*.

M. D., Dartmouth, 1899.

THOMAS MANN PRETTYMAN, *Assistant in Chemistry*.

STANDING COMMITTEES OF THE FACULTY

ADMISSION AND ADVANCED STANDING: Dean Worrell.

ATHLETICS: Professor Kidd; Instructor Fahrenwald.

BUILDINGS, GROUNDS, AND EQUIPMENT: Dean Worrell; Professor Kidd.

DISCIPLINE: The Faculty.

LIBRARY: Professor Seamon; Adjunct Professor Fielding.

PUBLICATIONS: Dean Worrell; Professor Pallister; Adjunct Professor
Fielding.

SCHEDULE AND EXAMINATIONS: Professor Kidd.

STUDENT ORGANIZATIONS: Professor Pallister; Adjunct Professor
Fielding.

STUDENT SOCIAL AFFAIRS: Professor Seamon; Instructor Fahrenwald.

*Absent on leave for the session of 1917-1918.

†Resigned April 4, 1918.

CALENDAR

The first semester of the School of Mines and Metallurgy begins on September 28, and ends on January 31.

The second semester begins on February 1, and ends on May 31.

The summer work in surveying (Engineering 4) begins on September 1, and lasts four weeks.

The summer work in field geology begins on September 1.

The following holidays will be observed: Thanksgiving, Christmas recess (December 24 to January 1, inclusive), Washington's Birthday, Texas Independence Day, and San Jacinto Day.

The first semester examinations will be held during the last week in January. The second semester examinations will be held during the last week in May.

The examinations in summer work will be held on the last day of the four weeks' period in each case.

Examinations to remove conditions will be given at the next regular examination period in January or May, except that conditions incurred in May may be removed in the September following, at the discretion of the professor in charge of the course.

GENERAL INFORMATION

HISTORY

An announcement of a course in mining appeared in the University catalogue first in 1900-1901. From then until the session of 1910-1911, an arrangement of courses leading to the degree of Mining Engineer appeared annually. The catalogue of that year contained a statement that thereafter freshmen would not be enrolled in mining, and the arrangement of courses leading to a degree in that subject was subsequently omitted.

The Thirty-third Legislature, at its regular session in 1913, passed an act creating a State School of Mines and Metallurgy, to be located at El Paso. By the terms of the act, the School of Mines is placed under the control of the Board of Regents of the University. The president of the University is its chief executive. Immediate charge of its affairs is in the hands of the dean.

The act of the Legislature conditioned the location of the school at El Paso upon the donation of the former Military Institute buildings and grounds. The necessary funds for this donation were secured through the activity of the Chamber of Commerce, and the school was opened in September, 1914. On October 29, 1916, the Main Building was burned. It was then decided to remove the institution to a more suitable site, on the west side of

Mount Franklin, donated for that purpose. The Thirty-fifth Legislature voted an emergency appropriation of \$100,000 to erect new buildings.

LOCATION

The location of the School of Mines is advantageous in several ways. The city of El Paso stands at the crossing of several of the oldest highways established by white men on this continent. With a population of 70,000, it is the most important city, south of Denver, between San Antonio and Los Angeles. Four transcontinental railroads cross the divide at this point.

El Paso's primary resources include mining, agriculture, live-stock, and timber. The United States government is spending \$10,000,000 on a great irrigation project to provide a cheap and unfailing water supply for the Rio Grande Valley above and below El Paso.

Its extreme dryness and medium latitude, combined with a moderately high altitude (4,000 feet), give El Paso a delightful and healthful climate all the year round.

Within a radius of from one to ten miles of El Paso are found in great variety those geological formations that are usually associated with the mining industry, not only in metal mining, but in coal mining as well. In opportunity for geological study, no mining school in the United States is more favorably located.

The second largest custom smelter in the world is situated about a mile from the School of Mines. It is fully supplied with equipment for the most modern methods of treating such ores of copper, lead, gold, and silver as are suitable for smelting. Students will find this an exceptional opportunity.

BUILDINGS AND GROUNDS

The campus contains twenty-three acres. There are five buildings: Main Building, Dormitory, Chemistry Building, Power House, and Mill. The Main Building contains the administrative offices, the department of physics, the department of geology and mineralogy, the department of drawing, the library, and various classrooms. The Chemistry Building contains the laboratories in chemistry and assaying. The Power House contains the heating plant and the engineering laboratory. The Dormitory contains rooms for fifty students, with shower bath and lockers for the athletic teams, a kitchen, and a dining-room. The Mill contains machinery for the testing of ores. All the buildings, except the Mill, are of stone, and fireproof.

POLICY OF THE SCHOOL

Emphasis will be placed on the practical or applied side of the instruction. Theory and practice must go hand in hand, so to speak,

the one supplementing the other. To further this idea, no member of the faculty will be employed, unless, in addition to his collegiate training, he has had at least five years' successful experience in the practice of his profession.

A thorough mastery by the student of the details of each required course offered will be insisted upon. In the future, as the demand may arise, supplementary courses will be offered enabling the student to specialize along various lines. It is the purpose of the school to give the student a good general education, whether he follows the practice of mining and metallurgy as his life work or not.

Athletics are encouraged, and play a prominent part in the student activities.

SPECIAL LECTURES

A series of lectures will be delivered before the Mining Club by members of the faculty and other engineers residing in El Paso. The Mining Club is an affiliated student society of the American Institute of Mining Engineers.

OPPORTUNITIES FOR SELF-HELP

To the student who is working his way, a city of the size of El Paso offers a large field of opportunity. A students' labor bureau will be maintained at the school, and every effort will be made to assist the student. The school assumes no responsibility except to the extent of trying to help. No student should come to El Paso without funds sufficient for at least the first semester.

ROTARY CLUB SCHOLARSHIP

The El Paso Rotary Club has established an annual scholarship of one hundred and fifty dollars for the student of the El Paso High School who makes the best grade on a competitive examination. The successful competitor must be able to satisfy the admission requirements.

REQUIREMENTS FOR ADMISSION

REGULAR STUDENTS

The standard of admission is fourteen and a half high school units, but students coming from affiliated schools with as many as eleven and a half units will be admitted on condition. This condition will be absolved if the student completes the first two years' work satisfactorily. Full credit for work done at an affiliated school will be given for admission, but no advanced standing will

be allowed except for work done in a college, and then only at the discretion of the faculty. An applicant holding a first-grade state teacher's certificate will be given eight and a half credits; one holding a permanent state teacher's certificate will be given twelve and a half credits. Applicants from New Mexico and Arizona will be admitted if they satisfy the admission requirements of their respective state universities.

Applicants twenty-one years of age who have substantially covered the ground of the number of units required of other candidates may be admitted by individual approval without examination.

The purpose of admission requirements is not to keep students out of the school, but to insure their having sufficient training to pursue the work with profit. Each case will be considered on its merits.

A student seeking admission from another college must present (1) a letter of honorable dismissal; (2) a catalogue of the college from which he comes; (3) a full statement of the work done, duly certified by the authorities of the college. All credit given must be regarded as provisional. If a student's work here is of low grade or shows lack of preparation, the credit given may be reduced.

New students are requested to send their credentials to the dean at least ten days before registration, if it is possible to do so.

SPECIAL STUDENTS

No special student will be admitted unless he is of age, and even then he must show good reason why he should not register for regular work.

EXPENSES

FEES

Tuition is free. A matriculation fee of thirty dollars, payable ten dollars yearly, is required. The amount of matriculation fees paid at the University will be credited here.

Laboratory fees and deposits cover the cost of the materials used and breakage. The following table shows the fees and deposits due in the several courses:

COURSE	FEE	DEPOSIT	TOTAL
General Chemistry	\$10.00	\$5.00	\$15.00
Analytical Chemistry	12.00	3.00	15.00
Assaying	15.00	5.00	20.00
Mineralogy	5.00	3.00	8.00
Physics	3.00	3.00	6.00

COURSE	FEE	DEPOSIT	TOTAL
Mechanics	3.00	3.00	6.00
Drawing	2.00	2.00
Summer Surveying	2.00	2.00
Mill-Work Course in Ore-Testing	5.00	5.00

The student will supply his own set of drawing instruments, which will cost from five to ten dollars.

In the summer course in surveying, the student will be required to pay any damage to instruments other than ordinary wear and use, which are covered by the fee of two dollars.

BOARD AND ROOM

The School of Mines maintains a dormitory and a dining-hall. Board costs twenty-two dollars a month. The large rooms rent for five dollars a month, the smaller ones for four dollars. A dormitory breakage deposit of five dollars is required, returnable if no damage is done to furniture, building, or fixtures. The student is responsible for damage to his room and its contents, whether caused by him or not. Two students may occupy a room, and divide the rent between them. The rooms are heated by steam, lighted by electricity, and furnished, except that no bedding of any sort is supplied. Board and room rent must be paid in advance on the first of the month. Rooms will be assigned in the order of application. Rooms will not be rented as private study or lounging rooms.

RULES AND REGULATIONS

The general regulations prevailing at the Main University as published in the catalogue will apply, where applicable, to the School of Mines and Metallurgy.

REQUIREMENTS FOR DEGREES AND CERTIFICATES

DEFINITION OF CREDIT

An hour of credit means one hour of recitation work a week for a semester. A three-hour laboratory period is regarded as the equivalent of one recitation. For example, if a course in geology consists of three lecture or recitation periods a week for one semester, it is rated a three-credit subject. Again, General Inorganic Chemistry requires three lectures or recitations with one laboratory period a week for two semesters. This, then, is an eight-credit subject.

ENGINEER OF MINES DEGREE

The completion of the following courses leads to the degree of Engineer of Mines.

First Year**First Semester**

SUBJECT AND NUMBER OF HOURS A WEEK		NUMBER OF CREDITS
Trigonometry	} 3.....	3
Algebra		
English, 3.....		3
Drawing, 6 hours draughting room.....		2
Chemistry, 3 lectures, 3 hours laboratory.....		4
Physics, 3 lectures, 3 hours laboratory.....		4
		—
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Second Semester

Trigonometry	} 2.....	2
Analytical Geometry		
English, 3.....		3
Drawing, 6 hours draughting room.....		2
Chemistry, 3 lectures, 3 hours laboratory.....		4
Physics, 2 lectures, 3 hours laboratory.....		3
Surveying, 3.....		3
		—
		17

Summer Work in Surveying:

Eight hours a day for four weeks.....	3
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Second Year**First Semester**

Calculus, 4.....	4
Analytical Chemistry, 9 hours laboratory.....	3
Geology, 3.....	3
Mineralogy, lectures and laboratory.....	3
Spanish, or French, or German, 3.....	3
	—
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Second Semester

Applied Mechanics, 4.....	4
Mine Surveying, 1.....	1

SUBJECT AND NUMBER OF HOURS A WEEK	NUMBER OF CREDITS
Geology, 3.....	3
Mineralogy, 3.....	3
Analytical Chemistry, 9 hours laboratory.....	3
Spanish, or French, or German, 3.....	3
	—
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Summer Work in Field Geology:	
Eight hours a day for four weeks.....	3

Third Year

First Semester

Assaying, 3 hours laboratory.....	1
Graphical Statics, 3.....	3
Thermodynamics, 2.....	2
Engineering Laboratory, 3.....	1
Metal Mining, 3.....	3
Ore Deposits, 3.....	3
Smelting, 3.....	3
	—
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Elective:	
Electricity Applied to Mining, 2.....	2
Chemistry 4, 1.....	1

NOTE.—Those who elect either of these courses may take assaying in the senior year.

Second Semester

Assaying, 3 hours laboratory.....	1
Hydraulics, 2.....	2
Air Compression, 2.....	2
Engineering Laboratory, 3.....	1
Mining Machinery and Placer Mining, 3.....	3
Petrography, 3.....	3
Smelting, 3.....	3
First Aid, 1.....	1
Mining Law, 1.....	1
	—
	17
Elective:	
Electricity Applied to Mining, 2.....	2

Fourth Year

First Semester

SUBJECT AND NUMBER OF HOURS A WEEK	NUMBER OF CREDITS
Chemistry 5, 1.....	1
Ore Dressing, 3.....	3
Economics, 3.....	3
Mine Management, 1.....	1
Leaching of Ores, 3.....	3
Coal Mining, 3.....	3
Mill Work, 1 day.....	2
Electrometallurgy, 1.....	1
Mineralogy of the Rare Minerals, 1.....	1
	—
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Second Semester

Ore Dressing, 3.....	3
Economics, 3.....	3
Mine Management, 1.....	1
Leaching of Ores, 3.....	3
Coal Mining, 3.....	3
Chemistry of the Rare Minerals, 3 hours laboratory.....	1
Ore-Dressing Problem.....	2
Mill Design.....	1
	—
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CERTIFICATES

A recent report of the Texas State Inspector of Mines calls attention to the desirability of offering special instruction to coal-mine foremen and pit bosses. To meet demands for instruction of this sort, two certificates are offered.

Mine Foreman's Certificate

The Mine Foreman's Certificate requires attendance for a year, and covers fully the proposed course recommended by the State Mining Board. The mathematics is covered by Mathematics A, a special outline of the subject planned specifically for this course. The work in geology, physics, and coal mining is the same as that offered as Geology 1, Physics 1 and 2, and Coal Mining. The course in Economics of Mining will be a briefer course than that offered under that head in "Mining." No special scholastic admission requirements will be demanded, except a common-school education and sufficient maturity. No student will be admitted who does not present a statement signed by former employers certifying to at least two

years' actual working experience in a coal mine. This statement will be filed for record with the student's registration card. A certificate will not be issued unless the student, upon the completion of his course, is twenty-one years of age or over. The cost of the course is the registration fee and the laboratory fee in physics.

COURSE OF INSTRUCTION

(ATTENDANCE REQUIRED)

FIRST SEMESTER	
Subjects	Hours a Week
Mathematics and Surveying.....	3
Geology 1.....	3
Physics 1.....	4
Coal Mining.....	3
First Aid to the Injured and Mine Rescue Work.....	1
SECOND SEMESTER	
Mathematics and Surveying.....	3
Geology 1.....	3
Physics 1.....	3
Coal Mining.....	3
Economics of Mining (Special Course).....	1

Pit Boss Certificate

There are in every coal-mining section of Texas and the Southwest ambitious men who desire better training to fit them for their profession as coal miners, but for whom a year at college is practically impossible. For the benefit of these men, the School of Mines offers a special reading course leading to a Pit Boss Certificate. The subjects covered are practical mathematics, mining methods, mining equipment, transportation methods, mine organization and safety, boilers, engines, elementary economics, etc. On receipt of a dollar and a half as a registration fee, printed instructions will be sent. The student will pay for his own books. As each section of the work is completed, a short set of examination questions and problems will be sent. On completion of the whole course, a final examination will be sent to the student's county superintendent of schools to be taken under his direction. On receipt of the student's answers, with the county superintendent's signed statement that the examination has been properly conducted, the student will be given a Pit Boss Certificate, provided he has correctly answered at least seventy-five per cent of the questions, is at least eighteen years old, and has had at least twelve months in actual coal-mine work. The only preparation

necessary to carry on this work successfully is an elementary education; that is, the ability to read and write English easily. A student under eighteen will not be accepted unless he has had one year in high-school work.

COURSE OF INSTRUCTION

(ATTENDANCE NOT REQUIRED)

Practical Mathematics, Palmer, Parts 1, 2, and 3.

Mining Methods and Shaft-Sinking.

Mining Equipment, Management, and Ventilating Equipment.

Boilers and Engines.

Elementary Economics.

COURSES OF INSTRUCTION

CHEMISTRY AND MINERALOGY

PROFESSOR SEAMON; ASSISTANT PRETTYMAN

CHEMISTRY

1. *General Inorganic Chemistry*.—The laws and theories of chemistry, with a study of the more important elements and their compounds. Three hours, both semesters; three credits. TTS 9. Professor SEAMON.

1a. *Laboratory Course*.—One afternoon, first semester; one credit. Th 1. Professor SEAMON; Assistant PRETTYMAN.

1b. *Qualitative Analysis*.—A detailed study of pure salts and of various complex ores. One afternoon, second semester; one credit. Th 1. Professor SEAMON; Assistant PRETTYMAN.

NOTE.—Courses 1, 1a, and 1b, although listed separately, form one integral course. The laboratory courses must be taken with the class work.

2. *Analytical Chemistry*.—A course intended to cover thoroughly all work that is done in a mine or smelter laboratory. Prerequisite: Chemistry 1. Three laboratory periods, both semesters; six credits. MWF 1. Professor SEAMON.

3. *Assaying*.—A consideration of furnace methods for the assay of lead, tin, silver, and gold. Prerequisite: Chemistry 2. One laboratory period, both semesters; two credits. Tu 1. Professor SEAMON.

4. *Chemistry of the Rare Minerals*.—A course in advanced mineral analysis. Prerequisite: Chemistry 2. One lecture or laboratory period, one semester; one credit. W 10. Professor SEAMON.

5. *Electrochemical Analysis*.—A course designed to give the student

a practical knowledge of the electrochemical methods of analysis and the more common chemical reactions which take place under the influence of the electric current. Prerequisite: Chemistry 2. One lecture or laboratory period, one semester; one credit. F 10. Professor SEAMON.

MINERALOGY

1. *Determinative Mineralogy*.—An elementary course in crystallography, followed by the determination of the more common minerals chiefly by means of their physical properties. Prerequisite: Chemistry 1. Three hours, lecture and laboratory, both semesters; six credits. TTS 11. Professor SEAMON.

2. *Mineralogy of the Rare Minerals*.—An advanced course. Lectures and laboratory work, one semester; one credit. Professor SEAMON.

DRAWING

PROFESSOR KIDD; INSTRUCTOR FAHRENWALD

1. *Mechanical Drawing*.—Two afternoons, both semesters; four credits. MW 1. Instructor FAHRENWALD.

ENGINEERING

PROFESSOR KIDD; INSTRUCTOR FAHRENWALD

1. *Physics: Mechanics and Heat*.—A preparation for the courses in applied mechanics, thermodynamics, and hydraulics. Three recitations and one laboratory period, first semester; four credits. TTS 10. Laboratory, F 1. Professor KIDD.

2. *Physics: Electricity and Magnetism*.—Two recitations and one laboratory period, second semester; three credits. MW 10. Laboratory, Tu 1. Professor KIDD.

3. *Surveying*.—General surveying with reference to land and claim surveying, more particularly with reference to the requirements of a Deputy United States Mineral Surveyor's work. Three hours, one semester; three credits. MWF 11. Instructor FAHRENWALD.

4. *Plane Surveying*.—Application of principles involved in Course 3. Eight hours a day during September. Professor KIDD.

5. *Mine Surveying*.—Underground surveying and mapping, underground connections, all the ordinary surveying operations that the mining engineer may be called upon to perform. One hour, second semester; one credit. Th 1. Instructor FAHRENWALD.

6. *Thermodynamics*.—Two hours, first semester; two credits. Professor KIDD.

7. *Air Compression*.—Fundamental definitions, theoretical considerations. Prerequisite: Mathematics 4, and Physics 1 and 2. Two hours, second semester; two credits. WF 11. Professor KIDD.

8. *Hydraulics*.—Prerequisite: Mathematics 4 and Physics 1 and 2. Two hours, second semester; two credits. MW 9. Professor KIDD.

9. *Applied Mechanics*.—Prerequisite: Mathematics 4 and Physics 1 and 2. Four hours, second semester; four credits. TTFS 9. Professor KIDD.

10. *Graphical Statics*.—Prerequisite: Course 9. Three hours, first semester; three credits. Professor KIDD.

11. *Engineering Laboratory*.—A laboratory course to supplement the instruction given in thermodynamics, air compression, hydraulics, and applied mechanics. One afternoon, both semesters; two credits. W 1. Professor KIDD; Instructor FAHRENWALD.

ENGLISH AND ECONOMICS

ADJUNCT PROFESSOR FIELDING

ENGLISH

1. *Composition and Rhetoric*.—A study of the rhetoric of the whole composition, of the paragraph, and of the sentence, and the analysis of masterpieces of English prose, with abundant practice in writing. Three hours, both semesters; six credits. MWF 10:30. Adjunct Professor FIELDING.

2. *Business English*.—Practice in writing business compositions, such as telegrams, letters, contracts, and mining reports. Also spoken English in the preparation of talks and addresses on technical subjects. One hour, first semester; one credit. S 11:30. Adjunct Professor FIELDING.

ECONOMICS

1. *Principles of Economics*.—Factors of production and the part these play in production and their shares in distribution. In the second semester, a brief survey of the economic situation and proposed remedies and reconstruction, with the principles of economics as applied to the mining industry and the problems peculiar to the Southwest and Mexico. Three hours, both semesters; six credits. TTS 10:30. Adjunct Professor FIELDING.

GEOLOGY

PROFESSOR PALLISTER

1. *General Geology*.—A careful study of dynamic, structural, and historical geology. Three hours, both semesters; six credits. MWF 11. Professor PALLISTER.

2. *Field Geology*.—A summer course; designed to give the student practice in the various processes involved in preparing a complete geological map. Prerequisite: Geology 1. One month in the summer, August 30 to September 27; three credits. Professor PALLISTER.

3. *Economic Geology and Ore Deposits*.—A study of the origin and occurrence of the non-metallic mineral deposits, and of ore deposits, together with the forces which bring about the deposition. Prerequisite: Geology 1. Three hours, first semester; three credits. TTS 10. Professor PALLISTER.

4. *Petrography*.—This course is intended primarily to prepare the student to be able, with the aid of a pocket lens, to identify the important rocks of the field. Prerequisite: Geology 1, 2, and 3. Three hours, second semester; three credits. TTS 10. Professor PALLISTER.

MATHEMATICS

PROFESSOR KIDD; INSTRUCTOR FAHRENWALD

A. *Practical Mathematics*.—A course intended primarily for students in the Coal-Mine Foreman's Course. No credit is allowed for it toward a degree. Three hours, both semesters. MWF 11. Instructor FAHRENWALD.

B. *Solid Geometry*.—MWF 8.

1. *College Algebra*.—A course in applied mathematics. Prerequisite: A course in high-school algebra and geometry. Three hours, one-third of the year; two credits. MWF 9. Instructor FAHRENWALD.

2. *Plane Trigonometry*.—Work preparatory to the course in surveying. Prerequisite: Mathematics 1. Three hours, two and a half months; two credits. MWF 10. Instructor FAHRENWALD.

3. *Plane Analytical Geometry*.—This course finds its application in mechanical drawing, mapping, surveying, and mensuration. Prerequisite: Mathematics 2. Two hours, two and a half months; two credits. TT 10. Instructor FAHRENWALD.

4. *Calculus*.—A knowledge of this course is essential to a thorough understanding of most textbooks on engineering subjects. Prerequisite: Mathematics 1, 2, and 3. Four hours, one semester; four credits. TTFS 9. Professor KIDD.

METALLURGY

PROFESSOR WORRELL

1. *Metallurgy of Smelting Processes*.—An introductory course in general metallurgy, followed by a detailed study of copper and lead smelting. Prerequisite: Chemistry 2. Three hours, both semesters; six credits. MWF 8. Professor WORRELL.

2. *Metallurgy of Leaching Processes*.—A study of the chemical and physical properties of the precious metals and of such of their compounds as are of importance in connection with the leaching processes; the cyanide process; chlorination; hyposulphite leaching and the Russell process, etc. Prerequisite: Chemistry 2. Two lectures and one laboratory period, both semesters; six credits. MWF 9. Professor WORRELL.

NOTE.—The course in assaying must either precede Metallurgy 1 and 2 or be taken at the same time.

3. *Ore Dressing and Milling*.—A study of the principles of amalgamation, concentration, and ore dressing. Two lectures and one laboratory period, both semesters; six credits. TTS 8. Professor WORRELL.

4. *Ore-Dressing Problem*.—Practice in working out everyday problems in ore dressing. Laboratory work and reports, second semester; one credit. M 1. Professor WORRELL.

5. *Electrometallurgy*.—An elective course. Two hours, one semester; two credits. M 10. Professor WORRELL.

MINING

PROFESSOR PALLISTER; LECTURER FIELDING

1. *Metal Mining*.—Three hours, first semester; three credits. TTS 8. Professor PALLISTER.

2. *Mining Machinery*.—Three hours, second semester (February, March, and April); two credits. TTS 8. Professor PALLISTER.

3. *Placer Mining*.—Three hours, second semester (May); one credit. TTS 8. Professor PALLISTER.

4. *Coal Mining*.—Three hours, both semesters; six credits. MWF 8. Professor PALLISTER.

5. *Oil and Gas Mining*.—The course covers varieties of oil and gas, origin, geological distribution, reservoirs, accumulation, pressure, shape of reservoirs, geological surfaces, effect of altitudes on accumulation, methods of locating oil and gas wells, oil and gas lands, drilling methods, bringing in a well, management of wells, condensation of gasoline from gas, natural gas industry, size and scope of oil and gas companies, reports on prospects or properties, valuation of properties, description of the oil and gas fields of North America, and the oil market and future supply. Prerequisite: Geology 1 and 2. Three hours, first semester; three credits. Professor PALLISTER.

6. *Mine Management*.—In this course, the student is given numerous problems in the management of mines, which he must work out in a practical way. One hour, both semesters; two credits. W 10. Professor PALLISTER.

7. *First Aid and Mine Rescue Work*.—One hour, one-half semester; one-half credit. Professor PALLISTER.

8. *Practice Mine Work*.—This course will be given at a mine on the campus of the school. Credit will be given if the student has had sufficient practical experience. Professor PALLISTER.

9. *Mining Law*.—Survey of mining laws of the United States, Texas, and Mexico. One hour, second semester; one credit. Tu 9. Lecturer FIELDING.

MODERN LANGUAGES

INSTRUCTOR HENRY

FRENCH

1. *Elementary French*.—The essentials of grammar, with exercises in speaking and writing. Reading of easy modern stories and plays. Three hours, both semesters; six credits. TTS 10. Instructor HENRY.

2. *Second-Year French*.—Rapid reading of modern fiction and drama, with practice in speaking. Three hours, both semesters; six credits. TTS 10. Instructor HENRY.

GERMAN

1. *Elementary German*.—Grammar, reading and writing of easy German. Three hours, both semesters; six credits. TTS 9. Instructor HENRY.

2. *Second-Year German*.—A continuation of the work in German 1. Three hours, both semesters; six credits. TTS 9. Instructor HENRY.

SPANISH

1. *Conversational Spanish*.—Three hours, both semesters; six credits. MWF 9. Instructor HENRY.

ORE TESTS, ASSAYS, AND ANALYSES

ORE TESTING MILL

An appropriation was made by the Thirty-fourth Legislature for the erection of a mill for ore-treating at the School of Mines. This mill is about completed. The construction has followed a definite idea, that idea being a mill for continuous operation and flow of ore as far as possible. The basis of capacity is two hundred pounds of ore an hour, and lots of less than a thousand pounds will not be treated. No "miniature plants" have been installed, nor any machine whose normal capacity under full load is in excess of two hundred and fifty pounds an hour.

MILL RUN TESTS ON ORE

Mill run tests on ore will be made free of charge to mine owners desiring tests for process of treatment, regardless of the location of

the mine, whether within or without Texas. The mine owner will be required to prepay all freight charges and the cost of the necessary assays. This work will be done by students under the personal direction of the professors in charge of the work, and will be carefully checked to insure that the work is accurate for the lot tested. Beyond this, the School of Mines can assume no responsibility. It is the function of the shipper to see to it that the lot shipped for treatment is a representative or average sample of his ore body. If he fails to do this, the test will be worthless, except for purposes of student instruction. All ore shipped to the School of Mines must be regarded as a gift to the school, and becomes the property of the school when it enters the mill building. The shipper will be expected to sign a statement that he has a body of ore developed of sufficient size to justify a treatment process test. The purpose of the work is to give instruction to students, to assist in the development of the Southwest, and to help prevent the installation of processes not adapted to the ore treated.

FREE ASSAYS FOR PROSPECTORS

The mining laws of the State of Texas require that one hundred dollars be spent yearly in the development of metal-mining claims that may be located in Texas. To foster and stimulate the development of mining in Texas, the School of Mines will do the assaying, free of charge, for the prospector or claim owner during the development stage of his property. The School of Mines is not hereby competing with the chemists or assayers to any serious extent. It is the purpose of the School of Mines to encourage proper development by insisting primarily on proper sampling. The subsequent assay on such samples will have a real value, whether done at the School of Mines or by the commercial assayer. The development of a mine from a prospect eventually increases the volume of work for the assayer, and redounds to his ultimate increased profit. Those who wish to avail themselves of the opportunity offered by the School of Mines should write for its printed instructions before sending samples.

Free assays will be made for the following minerals only: Gold, silver, lead, zinc, iron, manganese, tin, tungsten, copper, antimony, bismuth, mercury, and sulphur.

The school reserves the right to refuse to assay any sample submitted when it is evident to the authorities that it is useless to do so.

Free assays will not be made during the months of June, July, and August.

Identification, i. e., information as to what a mineral is, is made free of charge, regardless of the nature of the mineral or from what state it comes. All samples or specimens sent to the School of Mines become its property, and will be either kept or thrown away, at the discretion of the authorities of the school. Supposed gems or precious

stones should be sent for identification or valuation, not to the School of Mines, but to a jeweler or a lapidary.

ANALYSES OF ORES

The School of Mines has no desire to undertake analyses of ores in competition with professional assayers. Those who for special reasons wish their work done at the school should write to the dean for a statement of the conditions under which this is possible. Control work and sampling for ore shippers to the smelter will not be undertaken. Inquiries about coal should be sent to the Division of Economic Geology, about water to the Division of Chemistry, of the Bureau of Economic Geology and Technology, University of Texas, Austin.

